Proposed Amendments to and New Requirements for On-Board Diagnostics II (OBD II)

September 25, 2015
Today’s Presentation

• Background
• Proposed Amendments and New Requirements
• Summary
• On-Board Diagnostic (OBD) systems
  – Detect emission-control system problems
  – Reduce in-use emissions through faster identification/repair of problems

• How do they work?
  – Mostly software in engine computer
  – Illuminates ‘check engine light’ when fault is detected
  – Standardized information for repair technician to help fix vehicle
Benefits of OBD to Consumers

• Identifies emission-related components covered under warranty
  – Eliminates unnecessary repairs
  – Fault codes and other scan tool data give information about area of malfunction or a specific component

• Consumer protection
  – Durability incentivized by cost of warranty repairs / customer satisfaction

• Early Detection of Malfunctions
  – Prevent secondary malfunctions (e.g., detect misfire before catalyst damaged)
OBD: Where We Are Today

- OBD on vehicles since 1996
- 150+ million OBD II vehicles on the road in the US
- OBD II systems are used as basis for emission inspection programs throughout U.S.
- OBD-based Smog Check has been shown to be more effective and less expensive than traditional tailpipe testing or other inspection methods
Reason for Changes

• Amendments needed to address LEV III emission standards
  – OBD helps ensure emission reductions from LEV III program
• Program updates occur regularly
  – Technology forcing regulation
  – Periodic reviews to check progress
• Changes affect light- and medium-duty vehicles
LEV III Emission Malfunction Thresholds

• LEV III differs from LEV II
  – Combined NMOG and NOx tailpipe standards
  – New lower vehicle emission categories (ULEV70, ULEV50, SULEV20)
  – Lower PM tailpipe standards

• Proposal
  – Thresholds for combined NMOG+NOx standards
  – Thresholds for new lower emission categories
More Stringent Requirements

• Proposed changes to crankcase ventilation (CV) system monitoring requirements
  – Improved monitoring of hose failures in CV system from 2023MY for gasoline and 2025MY for diesel

• Proposed addition of evaporative system leak monitor testing
  – Align with U.S. EPA’s Tier 3 requirements for certification and in-use programs
Changes to Streamline OBD

• Address OBD implementation in light of Advanced Clean Car program
  – Vehicle design and emission controls more complex - emission control more heavily integrated with powertrain
  – Better defining limits of OBD requirement applicability improves clean vehicle implementation process

• Amendments proposed to exempt components with little or no emission benefit and to assist in OBD certification
Standardized Data

• Standardized data has always been integral to OBD
  – Ensures access to repair emission-related faults

• Current data also supports other ARB needs:
  – Smog Check inspections
  – OBD certification and compliance testing
  – Tailpipe certification and emission compliance testing

• Today’s proposal contains added data for these purposes
  – Would also include GHG data for the first time
Data for Real-World Emissions Evaluations

- Investigation of differences between real-world and test-cycle performance
  - Verify emission benefits achieved in-use
- National Academy of Sciences highlighted importance of understanding real-world GHG emissions in 2015 report
  - Critical to determine actual benefits and for consideration when establishing future standards
Proposal Specific to Plug-in Hybrids

- Data to quantify real world usage
  - Report total gasoline and electricity used and miles traveled
- Verify current and future regulations properly account for emissions
Proposal for “Off-cycle” Technologies

• Current GHG standards grant credits for technologies with additional benefits in-use
• Data would help quantify and validate these benefits
  – Report cumulative time technology is activated and/or how often it achieves the desired result
### Proposal for All Vehicles

Data to evaluate real-world GHG/fuel economy

<table>
<thead>
<tr>
<th>Proposed Data Parameter</th>
<th>Example Data</th>
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</thead>
<tbody>
<tr>
<td>Total distance traveled</td>
<td>25,388 miles</td>
</tr>
<tr>
<td>Total fuel consumed</td>
<td>738.3 gallons</td>
</tr>
<tr>
<td>Total vehicle / engine run time</td>
<td>887.7 / 842.4 hours</td>
</tr>
<tr>
<td>Total vehicle / engine idle time</td>
<td>148.1 / 112.4 hours</td>
</tr>
<tr>
<td>Total city / highway drive time</td>
<td>485.1 / 254.5 hours</td>
</tr>
<tr>
<td>Total Positive Kinetic Energy (PKE)</td>
<td>9,278,842.8 m/sec²</td>
</tr>
<tr>
<td>Total Engine Torque (work)</td>
<td>3,409,091.4 Newton-meters</td>
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</tbody>
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Addressing Concerns

• Concern #1: Data identifies driver habits

Response:

– Content minimized and stored in aggregate only
– Purposefully structured to only quantify vehicle (not driver) GHG performance
– No location or personally identifiable information
Addressing Concerns (cont.)

• Concern #2: Data transmitted or obtained without permission

  Response:
  – Access to data requires physical connection and vehicle owner permission
  – ARB will only collect data from voluntary participants
• Concern #3: Data can be stolen or misused

Response:
– No new access point to vehicle created
– Proposed data often already on cars (fuel economy displays)
– Data collected by ARB will be stored without specific vehicle VIN
Costs

• Minimal impacts to cost
  – $5.11/vehicle to vehicle manufacturer
  – $5.43/vehicle to consumer (<0.02% of retail price)

• Preserves benefits of LEV III program
Summary

• Proposed changes necessary to ensure successful OBD II and LEV III program
  – Balance of changes to streamline certification and strengthen the program
• Staff recommends adoption of amendments with 15-day changes
  – Technical clarifications, do not affect stringency